Ormosia Rondani (Diptera: Limoniidae: Chioneinae), a newly recorded genus from Shandong, China with description of one new species

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Abstract: The family Limoniidae includes a large number of species, including agricultural pests, pollinators, and environmental indicators. Here, the genus *Ormosia* Rondani, 1856, a large genus in the family Limoniidae, is recorded from Shandong, China for the first time. The species *O.* (*O.*) *kunyushana* Xu, Yang & Kang **sp. nov.** is described and illustrated as new to science. This species is distinguished from its congeners mainly by body color and male genitalia. A key to known Chinese *Ormosia* s. str. species is also provided.

Key words: crane flies; Chioneinae; new record; taxonomy

山东省新记录属——索大蚊属 *Ormosia* 并记一新种（双翅目：沼大蚊科：雪大蚊亚科）

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摘要：沼大蚊科昆虫种类繁多、习性多样，包括农业害虫、传粉昆虫、环境指示昆虫等，具有重要研究价值。本文记述了我国山东沼大蚊科 1 新记录属：索大蚊属 *Ormosia* 及其 1 新种：昆嵛山索大蚊 *O.* (*O.*) *kunyushana* Xu, Yang & Kang **sp. nov.**。新种主要通过体色和雄性腹部末端特征与其近缘物种区分。本文还提供了索大蚊亚属中国种类的分种检索表。

关键词：大蚊；雪大蚊亚科；新记录；分类

Introduction

Ormosia Rondani, 1856 is a large genus of 224 described species in the family

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Limoniidae. It is a cosmopolitan taxon known from the Palaearctic (95 species), Nearctic (93 species), Oriental (37 species), and Afrotropic (two species) regions (Oosterbroek 2022). Four subgenera are recognized within this genus: *Neserioptera* Alexander, 1956, *Oreophila* Lackschewitz, 1935, *Ormosia* s. str., and *Parormosia* Alexander, 1965.

Twenty-eight species from three subgenera are known to occur in China, of which most are distributed in Sichuan. In this paper, the genus *Ormosia* is recorded from Shandong, China for the first time. One new species, *O.* (*O.*) *kunyushana* Xu, Yang & Kang, **sp. nov.**, is described and illustrated. A key to Chinese *Ormosia* s. str. species is also presented.

Material and methods

Specimens for this study were collected from Mt. Kunyushan, Muping, Shandong, China in 2019 and deposited in the Entomological Museum of Qingdao Agricultural University, Qingdao, China (QAU). Adults were collected by insect net and stored in 75% ethanol in the field. Photographs were captured by a Canon EOS 90D digital camera. Genitalia were prepared by boiling the apical portion of the abdomen in lactic acid for 0.5 hours. Specimens were examined and illustrations prepared using a ZEISS Stemi 2000-C stereomicroscope. After examination, the removed abdomen was transferred to fresh glycerine and stored in a microvial pinned under the specimen.

The morphological terminology mainly follows McAlpine (1981) and Alexander & Byers (1981). The following abbreviations are used in figures: aed — aedeagus; cerc — cercus; goncx — gonocoxite; hyp vlv — hypogynial valve; i gonst — inner gonostylus; o gonst — outer gonostylus; pm — paramere; tg 9 — ninth tergite; tg 10 — tenth tergite.

Taxonomy

Ormosia Rondani, 1856

Ormosia Rondani, 1856: 180. Type species: *Erioptera nodulosa* Macquart, 1826 (original designation).

Ilisomyia Rondani, 1856: 180. Type species: *Ilisomyia nubipennis* Rondani, 1856 (original designation).

Small limoniid crane flies with body length 4.0–7.0 mm. Body mostly dark colored with abundant macrotrichiae. Antennae of different length; flagellomere with 14 segments, usually cylindrical, oval or fusiform. Thorax hairy. Wings wide. Sc_1 long, ending beyond R_2, Sc_2 far away from its tip; R_2 near fork of R_{2+3+4}; cell dm usually open by absence of basal section of M_3, closed only in few species; tip of A_2 not reaching level of basal section of CuA_1. Male genitalia semi-inverted. Ninth tergite with a large median caudal projection. Gonocoxite simple, usually with two pairs of gonostyli. Aedeagus usually simple without bifid apex.

Check list of Chinese *Ormosia* species

1. *O.* (*Oreophila*) *subducalis* Alexander, 1940 — Sichuan
2. *O.* (*Oreophila*) *weymarni* Alexander, 1950 — Heilongjiang; also North Korea
3. *O.* (*Ormosia*) *affixa* Alexander, 1936 — Sichuan
4. *O.* (*Ormosia*) *anthracopoda* Alexander, 1930 — Taiwan
5. *O.* (*Ormosia*) *arisanensis* Alexander, 1924 — Taiwan

6. *O.* (*Ormosia*) *auricosta* Alexander, 1933 — Sichuan
7. *O.* (*Ormosia*) *beatifica* Alexander, 1938 — Sichuan
8. *O.* (*Ormosia*) *biannulata* Alexander, 1936 — Sichuan
9. *O.* (*Ormosia*) *curvispina* Alexander, 1936 — Sichuan
10. *O.* (*Ormosia*) *decorata* Alexander, 1940 — Sichuan
11. *O.* (*Ormosia*) *defessa* Alexander, 1938 — Sichuan
12. *O.* (*Ormosia*) *diplotergata* Alexander, 1928 — Taiwan
13. *O.* (*Ormosia*) *diversipennis* Alexander, 1935 — Taiwan
14. *O.* (*Ormosia*) *fixa* Alexander, 1936 — Sichuan
15. *O.* (*Ormosia*) *formosana* Edwards, 1921 — Taiwan
16. *O.* (*Ormosia*) *fugitiva* Alexander, 1935 — Sichuan
17. *O.* (*Ormosia*) *grahami* Alexander, 1931 — Sichuan; also India and Myanmar
18. *O.* (*Ormosia*) *inaequispina* Alexander, 1940 — Sichuan
19. *O.* (*Ormosia*) *insolita* Alexander, 1938 — Sichuan
20. *O.* (*Ormosia*) *kunyushana* Xu, Yang & Kang, **sp. nov.** — Shandong
21. *O.* (*Ormosia*) *officiosa* Alexander, 1936 — Sichuan
22. *O.* (*Ormosia*) *praecisa* Alexander, 1932 — Sichuan
23. *O.* (*Ormosia*) *profesta* Alexander, 1936 — Sichuan
24. *O.* (*Ormosia*) *shoreana* Alexander, 1929 — Taiwan
25. *O.* (*Ormosia*) *solita* Alexander, 1936 — Sichuan
26. *O.* (*Ormosia*) *tenuispinosa* Alexander, 1936 — Sichuan
27. *O.* (*Parormosia*) *angustaurata* Alexander, 1936 — Sichuan
28. *O.* (*Parormosia*) *lataurata* Alexander, 1936 — Sichuan
29. *O.* (*Parormosia*) *nigripennis* Alexander, 1936 — Sichuan

Key to Chinese *Ormosia* (*Ormosia*) species

1. Antenna with flagellomeres obviously bicolorous, each segment dark brown with tip yellow (Alexander 1924a)····· *O.* (*O.*) *arisanensis*
- . Antenna with flagellomeres not as above····· 2
2. Basal section of CuA_1 more than 1/3 its length before fork of M····· 3
-. Basal section of CuA_1 close to or beyond fork of M····· 10
3. Sc_2 opposite more than 2/5 of Rs····· 4
-. Sc_2 opposite less than 1/3 of Rs····· 6
4. Femora brownish yellow with tips pale yellow····· *O.* (*O.*) *kunyushana* **sp. nov.**
-. Femora yellow with narrow brown subterminal rings····· 5
5. Pleura black, coxae brownish black, R_2 about its length beyond fork of R_{2+3+4} (Alexander 1933)····· *O.* (*O.*) *auricosta*
-. Pleura dark brown, coxae brown, R_2 close to fork of R_{2+3+4} (Alexander 1935a)····· *O.* (*O.*) *diversipennis*
6. Pleura gray, Sc_2 opposite about 1/5 of Rs····· 7
-. Pleura brown to black, Sc_2 opposite about 1/3 of Rs····· 8
7. Antenna black throughout, prescutum with four longitudinal stripes, femora black throughout, outer gonostylus undivided (Alexander 1930)····· *O.* (*O.*) *anthracopoda*
-. Antenna black with basal segments pale brown, prescutum with three longitudinal stripes, femora obscure yellow with broad brownish black subterminal rings, outer gonostylus divided into two branches (Alexander 1929)····· *O.* (*O.*) *shoreana*

8. Antenna black; femora black, each with three narrow yellow rings at base, basal 2/3 and tip; gonostyli at tip of gonocoxite (Alexander 1936a) ····· *O.* (*O.*) *biannulata*
-. Antenna dark brown; femora yellow, each with a dark subterminal ring; gonostyli at about 2/3 of gonocoxite ····· 9
9. Prescutum with three longitudinal stripes, gonocoxite without acute sclerotized point at tip (Alexander 1938a) ····· *O.* (*O.*) *insolita*
-. Prescutum without longitudinal stripes, gonocoxite with acute sclerotized point at tip (Alexander 1936b) ····· *O.* (*O.*) *solita*
10. Cell dm closed (Alexander 1931) ····· *O.* (*O.*) *grahami*
-. Cell dm open by absence of basal section of M_3 ····· 11
11. Sc_2 opposite less than 1/3 of Rs ····· 12
-. Sc_2 opposite more than 2/5 of Rs ····· 17
12. Antenna black or dark brown with basal segments paler, femora light yellow throughout ····· 13
-. Antenna black or dark brown throughout, femora dark brown throughout or mostly dark brown ····· 14
13. Pleura dark brown, coxae brown, tarsi light yellow throughout (Alexander 1938b) ····· *O.* (*O.*) *beatifica*
-. Pleura plumbeous, coxae light yellow, tarsi light yellow with terminal segments brown (Alexander 1928) ····· *O.* (*O.*) *diplotergata*
14. Femora with narrow yellow subterminal rings (Edwards 1921) ····· *O.* (*O.*) *formosana*
-. Femora without narrow yellow subterminal rings ····· 15
15. Femora dark brown with basal 1/2 brownish yellow, pleura black, inner branch of paramere very strongly curved (Alexander 1940) ····· *O.* (*O.*) *decorata*
-. Femora dark brown throughout, pleura grey or dark brown, inner branch of paramere straight ····· 16
16. Antenna with flagellomeres long-oval; paramere with inner branch appearing as flattened plate, outer branch with a series of teeth (Alexander 1938b) ····· *O.* (*O.*) *defessa*
-. Antenna with flagellomeres fusiform; paramere with inner branch appearing as acute spine, outer branch without teeth (Alexander 1940) ····· *O.* (*O.*) *inaequispina*
17. Legs black throughout except coxae and trochanters ····· 18
-. Legs not as above ····· 21
18. Wing with distinct spots at Sc_2, origin of Rs and ends of all longitudinal veins; outer branch of paramere with numerous spinous points (Alexander 1936c) ····· *O.* (*O.*) *profesta*
-. Wing not as above; outer branch of paramere without numerous spinous points ····· 19
19. Pleura black, inner branch of paramere appearing as a curved spine (Alexander 1936b) ····· *O.* (*O.*) *curvispina*
-. Pleura gray to dark gray, inner branch of paramere not as above ····· 20
20. Antenna short, if bent backward extending about halfway to wing root; trochanters brownish black; paramere with inner branch curved (Alexander 1936c) ····· *O.* (*O.*) *fixa*
-. Antenna long, if bent backward extending to shortly beyond base of abdomen; trochanters brownish yellow; paramere with inner branch nearly straight (Alexander 1936c) ····· *O.* (*O.*) *tenuispinosa*
21. Femora black, wing with spots at ends of longitudinal veins (Alexander 1932) ····· *O.* (*O.*) *praecisa*
-. Femora light yellow or dark brown, wing without spots at ends of longitudinal veins ····· 22
22. Prescutum pale testaceous with middle darkened; femora light yellow (Alexander 1935b) ····· *O.* (*O.*) *fugitiva*
-. Prescutum reddish brownish throughout; femora dark brown ····· 23
23. Pleura dark gray, legs (except coxae and trochanters) dark brown with tarsi passing into black, paramere with a sharp lateral spine at midlength and a curved finger-like lobule at base (Alexander 1936c) ····· *O.* (*O.*) *affixa*

-. Pleura black, legs (except coxae and trochanters) dark brown with tibiae and tarsi brighter, paramere without sharp lateral spine or curved finger-like lobule (Alexander 1936c)····· *O.* (*O.*) *officiosa*

***Ormosia* (*Ormosia*) *kunyushana* Xu, Yang & Kang sp. nov.** (Figs 1, 2)

Description. Male. Body length 5.3–6.0 mm, wing length 5.5–6.0 mm.

Head (Fig. 1B). Dark brown. Hairs on head brown. Antenna length 1.0–1.1 mm. Scape long cylindrical, brown with brown hairs; pedicel conical, brown with basal 1/2 brownish yellow, with brown hairs; flagellomeres oval, tapering apically, brown with brown hairs, each flagellomere with two long brown hairs dorsally. Mouthparts brown with brown hairs; palpus brown with brown hairs.

Thorax (Fig. 1C). Pronotum brown. Prescutum brown with three broad dark brown longitudinal stripes, median stripe with a medially narrow black line. Scutum brown with middle area darker, each lobe with an anterior dark brown spot. Scutellum dark brown with lateral anterior margin and posterior margin black. Mediotergite dark brown. Pleura (Fig. 1A) brown with upper 1/2 slightly darker. Hairs on thorax brown. Coxae brown; trochanters pale yellow; femora brownish yellow with tips pale yellow; tibiae brown with bases brownish yellow; tarsi brown with terminal segments slightly darker. Hairs on legs brown. Wing (Fig. 1D) strongly infuscate. Stigma dark brown; narrow dark brown seams along cord; restricted dark brown clouds at Sc_2 and near base of wing. Venation: Sc_1 ending beyond R_2, Sc_2 opposite about 2/5 of Rs; R_2 at fork of R_{2+3+4}; basal section of CuA_1 about 1/3 its length before fork of M; A_2 sinuous at 2/3 length. Halter length 0.8–0.9 mm, pale with knob darker.

Abdomen. Tergites brown with lateral borders pale. Sternites brown. Hairs on abdomen brown. Hypopygium (Fig. 2). Ninth tergite with widely rounded caudal margin and a large median projection; caudal margin of this projection emarginated. Gonocoxite elongate, three times as long as it is wide, tip with a brush of long setae. Gonostyli at 2/3 of gonocoxite. Outer gonostylus stout, slightly curved near middle, tip sclerotized and blunt. Inner gonostylus arched at 1/3 length with distal 1/3 sclerotized and tip acute. Paramere divided into two branches: outer (ventral) branch thinner and longer than inner branch, tip acute and bend inwards; inner (dorsal) branch sclerotized with a subbasal tooth, tip acute and bent inwards. Aedeagus long and thin, tip acute and bent ventrally.

Female. Body length 5.5–5.8 mm, wing length 5.8–6.0 mm. Similar to male, but tenth tergite (Fig. 1E) dark brown. Cercus pale brown. Hypogynial valve brownish yellow with base brown, tip at 2/3 of cercus.

Immature stages unknown.

Holotype. ♂(QAU: ORM0001), **China**, Shandong, Muping District, Mount Kunyushan, 19-V-2019, Peifu ZHANG leg. **Paratypes**. 3♂2♀(QAU: ORM0002–ORM0006), same data as holotype.

Etymology. The specific epithet *kunyushana* (adjective, feminine) refers to the type locality Mt. Kunyushan.

Diagnosis. Prescutum brown with three broad dark brown longitudinal stripes. Pleura brown with upper 1/2 slightly darker. Wing strongly infuscate; Sc_2 about opposite 2/5 of Rs, R_2 at fork of R_{2+3+4}, basal section of CuA_1 about 1/3 its length before fork of M. Gonocoxite with gonostyli at 2/3 length and a brush of long setae at apex. Paramere divided into two branches.

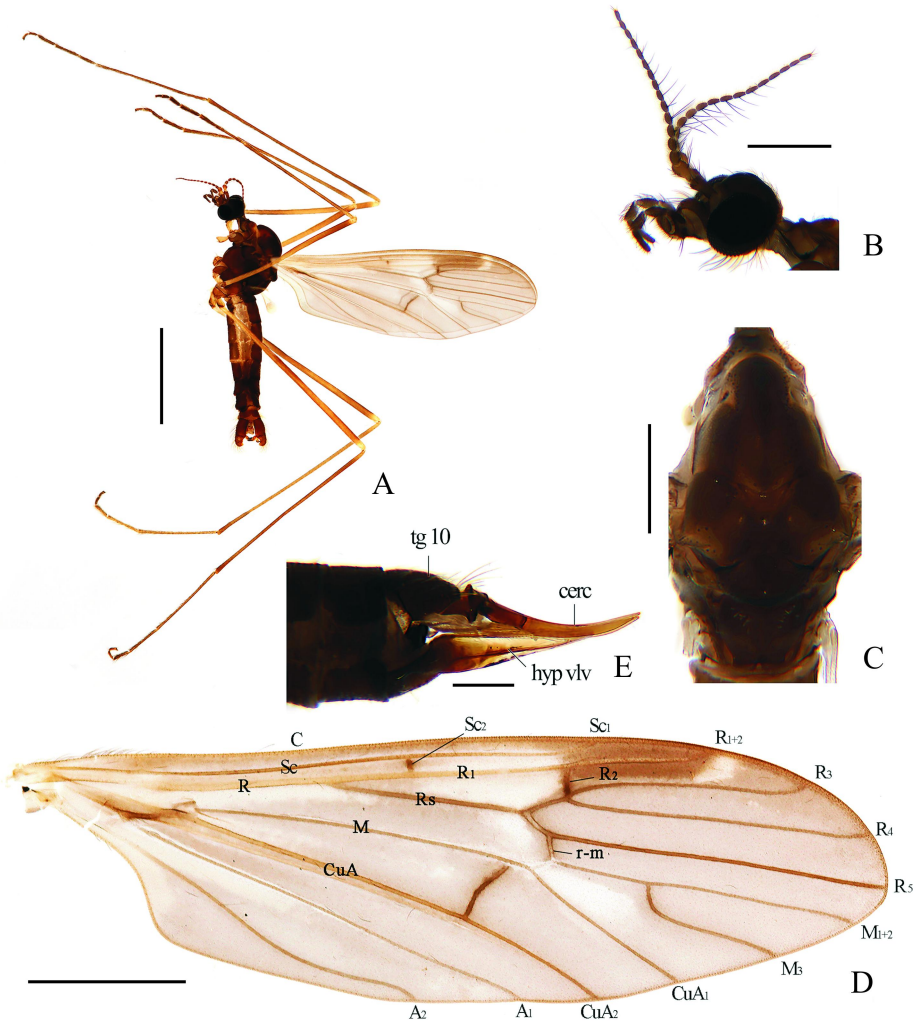

Figure 1. *Ormosia* (*Ormosia*) *kunyushana* Xu, Yang & Kang **sp. nov.** A. Habitus of male, lateral view; B. Head, lateral view; C. Thorax, dorsal view; D. Wing; E. Female ovipositor, lateral view. Scale bars = 2.0 mm (A); 0.5 mm (B, C); 1.0 mm (D); 0.2 mm (E).

Remarks. *Ormosia* (*O.*) *kunyushana* Xu, Yang & Kang **sp. nov.** is similar to *O.* (*O.*) *auricosta* and *O.* (*O.*) *beatifica* from China in having similar wing patterns but can be separated by the prescutum of the thorax having three broad longitudinal stripes and the femora of the legs being brownish yellow with pale yellow tips. In *O.* (*O.*) *auricosta* and *O.* (*O.*) *beatifica*, the prescutum of the thorax has no obvious markings. The femora of the legs are yellow with narrow brown subterminal rings in *O.* (*O.*) *auricosta* and are light yellow throughout in *O.* (*O.*) *beatifica* (Alexander 1933, 1938b). This new species is also similar to *O.* (*O.*) *horiana* Alexander, 1924 from Japan in having similar wing venation but can be separated by the short antenna (if bent backward extending about halfway to wing root), the femora of the legs being brownish yellow with pale yellow tips, the tip of the gonocoxite

without a slender needle-like point, and the paramere being divided into two branches. In *O.* (*O.*) *horiana*, the antenna is long (if bent backward extending to beyond base of abdomen), the femora of the legs are brown with blackened tips, the tip of the gonocoxite has a slender needle-like point, and the paramere is undivided (Alexander 1924b).

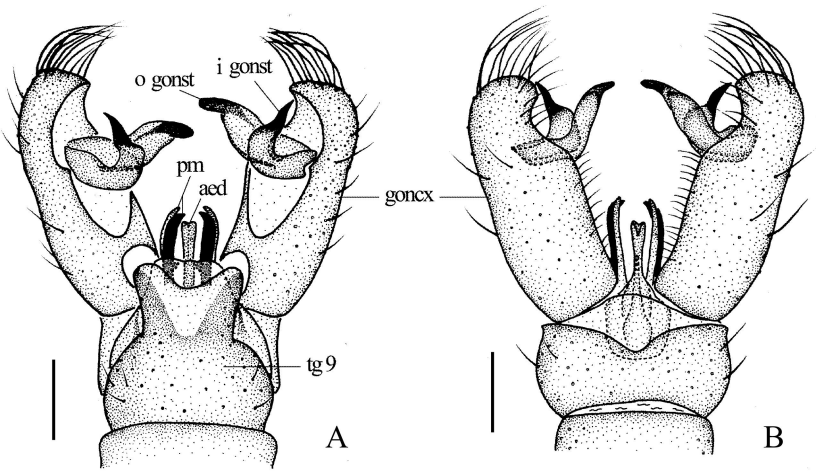

Figure 2. *Ormosia* (*Ormosia*) *kunyushana* Xu, Yang & Kang **sp. nov.**, male hypopygium. A. Dorsal view; B. Ventral view. Scale bars = 0.2 mm.

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